Chapter 4
Item Analysis

Introduction

Item analyses were conducted for each form of each of the eighteen grade/subject area assessment instruments of Kentucky Core Content Tests. In this chapter, we present summary information by grade/subject, as well as information about each of the forms. The information includes mean scores and discrimination indices for each item on the form and reliability indices for the form. The data are based on the calibration datasets that, as described in the chapter "Scaling, Linking, and Producing Scale Scores," include all students for whom complete data were available from the scoring process at the time calibration took place. The decision about when to calibrate for each grade/subject area was based on the number available. A summary of these numbers is presented in Table 4.1.

For multiple-choice (MC) items, the mean score is simply the proportion of students who gave a correct response to the item (usually referred to as the difficulty index or p-value), and the discrimination index is the point biserial correlation between the item score and the total raw score on the test. The percent range of omits provides the percent omit rate for the least often skipped multiple-choice item to the most often skipped multiple-choice item on each form.

For open-response (OR) items, the mean score is the mean of the students' scores on a scale of zero through four. The discrimination is the correlation between the item score and the total score. The percent range of omits provides the percent omit rate for the least often skipped open-ended item to the most often skipped open-ended item on each form. As noted in the footnotes of the table, there were three cases in which sub-forms differed due to printing irregularities. Sub-forms were designed to differ only in the pretest items they contained. In grade 5 mathematics, the last item on form 6 differed, so there were two subforms that differed by one item for the item analyses. A similar difference existed in the last item on form 2 in grade 5 social studies resulting in two subforms. Finally, in grade 7 science, the last item on Form 2A could not be used. In this case, one item analysis was computed on the 29 items common to both forms and a second analysis was done on form 2B to compute item statistics for the 30th item.

For all grades and content areas, scale scores ranged from 325 to 800 with a mean of about 500 and a standard deviation of about 50. As noted in Chapter 7, under Scoring Tables, Kentucky differentially weights OR and MC items for students' final scores. In this item analysis section, weighted values are not used.

Table 4.1
Numbers of Students Administered Each Test Form

Grade	Subject	Number of Forms	Range of N
4	Reading	6	7921-7961
	Science	6	7920-7962
5	Arts & Humanities	12	3737-3835
	Mathematics	5	7627-7706
	Math Sub forms*	2	3862-3810
	Prac. Liv./Voc. Stud.	12	3767-3870
	Social Studies	5	7627-7706
	Soc. Stu. Sub forms*	2	3815-3858
7	Reading	6	7749-7919
	Science	6	7743-7915
	Sc. Sub form**	1	3984
8	Arts & Humanities	12	3708-3788
	Mathematics	6	7958-8024
	Prac. Liv./Voc. Stud.	12	3972-4051
	Social Studies	6	7955-8019
10	Prac. Liv./Voc. Stud.	12	3708-3788
	Reading	6	7399-7473
11	Arts & Humanities	12	3293-3361
	Mathematics	6	6611-6656
	Science	6	5721-6655
	Social Studies	6	6573-6629

* Forms 6A and B in Mathematics and 2A and B in Social Studies differed on one item so these sub forms were processed in separate item analyses.

** Form 2A had one less item than form 2B so one item analysis was computed with the 29 items common to both forms and one analysis on form 2A to get statistics for the 30th item.

Grade 4 Forms

Tables 4.2 and 4.3 contain summaries of the item statistics for the grade 4 reading and science forms, respectively. In these and the similar tables for the other grades, "RS" represents raw score, "SS" scale score, "std. dev." standard deviation, "p-value" item difficulty index, and "pt. biserial" the point biserial correlation between a dichotomous item score and the total raw score. The alpha reliability is frequently used to measure internal consistency. This measure is used when both multiple-choice and open-ended items are in a test. The alpha reliability is based on a single test administration and provides reliability estimates that equal the average of all split-half reliability coefficients that would have been obtained on all possible divisions of the test into halves. This measure of reliability is the lower bound of the reliability estimate. The percent range of omits shows the percentage of all students assigned to the form who left an item blank. To illustrate, for Grade 4 reading multiple choice, the range of omitted items for Form 1 was as low as 0.09% and as high as 0.64% of the 7961 students assigned to that form.

Table 4.2
Grade 4 Reading Summary Statistics by Form

Form	1	2	3	4	5	6
Multiple Choice (24 Items per form)						
p-value range	.41 to .92	.46 to .92	.33 to .89	.45 to .90	.45 to .85	.46 to .88
pt. biserial r range	.23 to .53	.24 to .47	.23 to .52	.19 to .54	.23 to .55	.26 to .59
% range of omits	.09 to .64	.04 to .50	.04 to .56	.05 to .83	.05 to .60	.06 to .59
Open Ended (6 four-point items per form)						
Mean range	1.73 to 1.98	1.41 to 2.08	1.93 to 2.25	1.60 to 2.13	1.54 to 1.87	1.65 to 1.87
r with total RS	.59 to .67	.61 to .64	.60 to .71	.59 to .70	.59 to .69	.61 to .66
% range of omits	.20 to .68	.16 to .68	.20 to .88	.18 to .77	.23 to .63	.19 to .67
Mean RS	28.4	28.3	29.0	28.3	25.9	27.8
RS std. dev.	6.9	6.9	7.5	7.0	7.5	7.7
Alpha reliability	.87	.87	.88	.87	.87	.88
Mean SS	546.4	545.8	545.9	545.1	543.6	544.3
SS std. dev.	36.2	36.5	36.3	36.7	36.9	37.1

Table 4.3
Grade 4 Science Summary Statistics by Form

Form	1	2	3	4	5	6
Multiple Choice (24 items per form)						
p-value range	.31 to .84	.21 to .93	.44 to .89	.28 to .88	.19 to .92	.39 to .83
pt. biserial r range	.03 to .46	.09 to .51	.24 to .51	.23 to .43	.17 to .48	.27 to .50
% range of omits	.06 to .44	.08 to .49	.04 to .58	.08 to .45	.04 to .52	.08 to .46
Open Ended (6 four-point items per form)						
Mean range	1.04 to 2.01	1.21 to 2.82	1.50 to 2.02	1.14 to 2.25	.96 to 2.10	1.56 to 2.27
r with total RS	.56 to .63	.48 to .61	.50 to .68	.49 to .69	.48 to .63	.48 to .63
% range of omits	.25 to 1.05	.19 to 1.06	.11 to .90	.10 to 1.03	.11 to .93	.19 to .92
Mean RS	22.3	23.4	27.4	27.2	23.7	24.1
RS std. dev.	7.3	6.9	8.1	7.6	7.5	8.8
Alpha reliability	.80	.78	.85	.82	.82	.83
Mean SS	536.5	538.7	539.1	539.6	538.8	538.6
SS std. dev.	32.7	32.2	31.6	31.4	32.1	33.0

Grade 5 Forms

Tables 4.4 through 4.7 contain summaries of the item statistics for the grade 5 arts and humanities, mathematics, practical living/vocational studies, and social studies forms, respectively.

Table 4.4
Grade 5 Arts and Humanities Summary Statistics by Form

Form	1A	1B	2A	2B	3A	3B
Multiple Choice (8 items per form)						
p-value range	.54 to .85	.33 to .79	.61 to .84	.55 to .75	.73 to .81	.54 to .80
pt. biserial r range	.43 to .50	.32 to .55	.38 to .52	.23 to .50	.38 to .54	.36 to .48
% range of omits	.16 to 1.01	.08 to .29	.39 to .52	.34 to .47	.23 to .72	.18 to .60
Open Ended (2 four-point items per form)						
Means	2.02, 2.38	2.10, 2.31	1.78, 1.92	1.94, 2.30	1.89, 1.91	2.08, 2.10
r with total RS	.69, .74	.74, .76	.71, .73	.69, .71	.68, .70	.71, .76
% range of omits	1.58 to 1.68	1.15 to 1.17	.80 to 1.45	.79 to .99	1.01 to 1.11	1.00 to 1.26
Mean RS	9.8	9.4	9.2	9.4	10.0	9.9
RS std. dev.	3.0	3.2	3.2	3.1	2.7	2.9
alpha reliability	.69	.69	.69	.65	.67	.68
Mean SS	500.5	500.7	500.9	501.4	502.4	501.0
SS std. dev.	63.7	65.1	64.2	66.4	63.1	61.9
Form	**4A**	**4B**	**5A**	**5B**	**6A**	**6B**
Multiple Choice						
p-value range	.55 to .78	.50 to .82	.59 to .72	.40 to .79	.53 to .77	.28 to .81
pt. biserial r range	.36 to .52	.41 to .55	.38 to .45	.37 to .50	.27 to .52	.29 to .47
% range of omits	.16 to .36	.29 to .58	.28 to .60	.19 to .45	.23 to .44	.26 to .42
Open Ended						
Means	2.06, 2.23	1.63, 1.93	1.53, 2.11	1.78, 2.07	1.80, 2.03	2.20, 2.25
r with total RS	.68, .70	.71, .75	.66, .74	.71, .73	.73, .74	.70, .72
% range of omits	.85 to 1.29	.95 to 1.16	.93 to 1.14	.82 to 1.11	.98 to 1.94	1.26 to 1.28
Mean RS	9.8	9.3	8.8	9.3	8.9	9.3
RS std. dev.	2.8	3.0	3.2	3.2	3.2	3.0
alpha reliability	.65	.69	.62	.65	.64	.63
Mean SS	500.4	500.4	498.9	502.3	500.7	500.4
SS std. dev.	63.7	62.7	69.6	67.8	66.7	64.9

Table 4.5
Grade 5 Mathematics Summary Statistics by Form

Form	1	2	3	4	5	6A	6B
Multiple Choice (24 items per form)							
p-value range	.25 to .82	.28 to .87	.55 to .83	.38 to .86	.21 to .91	.24 to .84	25 to .85
pt. biserial r range	.22 to .55	.13 to .61	.28 to .73	.11 to .49	.19 to .62	.17 to .58	.18 to .55
% range of omits	.05 to .32	.06 to .27	.07 to .34	.05 to .35	.08 to .39	.07 to .36	.07 to .36
Open Ended (6 four-point items per form							
Mean range	.78 to 2.07	1.29 to 2.20	1.89 to 2.58	1.59 to 2.18	.72 to 2.22	1.31 to 2.40	1.38 to 2.47
r with total RS	.60 to .74	.57 to .71	.59 to .74	.59 to .73	.52 to .72	.67 to .76	.66 to .76
% range of omits	.17 to 83	.08 to .73	.25 to .59	.25 to 1.06	.34 to 1.61	.43 to .91	.43 to .91
Mean RS	22.9	23.8	29.9	27.8	22.7	23.3	23.7
RS std. dev.	10.1	8.9	10.0	9.0	9.0	10.2	10.2
alpha reliability	.87	.84	.87	.85	.85	.87	.88
Mean SS	548.9	551.2	552.4	552.2	551.9	550.0	551.9
SS std. dev.	41.3	41.6	41.5	40.1	40.6	41.1	40.7

Table 4.6
Grade 5 Social Studies Summary Statistics by Form

Form	1	2A	2B	3	4	5	6
Multiple Choice (24 items per form)							
p-value range	.37 to .85	.29 to .84	.30 to .86	.46 to .80	.17 to .85	.39 to .89	.30 to .83
pt. biserial r range	.22 to .45	.16 to .51	.17 to .51	.31 to .53	.23 to .41	.20 to .47	.09 to .48
% range of omits	.08 to .30	.03 to .31	.03 to .31	.05 to .35	.04 to .30	.08 to .30	.08 to .30
Open Ended (6 four-point items per form							
Mean range	1.58 to 2.16	1.65 to 2.06	1.91 to 2.02	1.74 to 2.19	1.36 to 2.01	1.81 to 2.27	1.43 to 2.13
r with total RS	.54 to .68	.57 to .65	.53 to .65	.56 to .64	.59 to .66	.59 to .74	.56 to .65
% range of omits	.29 to 1.01	.11 to 1.01	.11 to 1.10	.08 to 1.07	.29 to 1.45	.22 to .90	.21 to .89
Mean RS	27.2	25.9	26.4	27.8	25.6	27.9	25.1
RS std. dev.	7.2	7.4	7.2	7.9	7.0	7.5	7.4
alpha reliability	.83	.84	.83	.87	.83	.84	.82
Mean SS	536.4	535.6	536.9	536.4	535.1	535.4	535.7
SS std. dev.	35.7	36.1	35.1	35.6	35.5	35.5	36.2

Table 4.7
Grade 5 Practical Living/Voc. Studies Summary Statistics by Form

Form	1A	1B	2A	2B	3A	3B
Multiple Choice (8 items per form)						
p-value range	.33 to .75	.56 to .95	.21 to .81	.49 to .83	.59 to .76	.54 to .80
pt. biserial r range	.18 to .54	.32 to .52	.18 to .47	.37 to .54	.34 to .51	.32 to .55
% range of omits	.31 to .75	.16 to .76	.52 to .83	.39 to .68	.28 to .65	.26 to .81
Open Ended (2 four-point items per form)						
Means	1.90, 1.96	1.97, 2.17	2.17, 2.17	2.09, 2.20	1.72, 2.05	2.12, 2.24
r with total RS	.68, .71	.68, .76	.71, .76	.66, .71	.71, .71	.66, .69
% range of omits	.69 to .88	.47 to .62	.54 to .93	.45 to .83	.52 to 1.06	.37 to .68
Mean RS	8.6	10.0	8.9	10.0	9.2	9.9
RS std. dev.	3.0	2.8	3.1	2.9	3.1	2.7
alpha reliability	.60	.62	.61	.65	.69	.64
Mean SS	500.6	500.7	500.2	503.8	501.2	501.3
SS std. dev.	68.9	64.4	66.2	67.4	64.3	63.9
Form	**4A**	**4B**	**5A**	**5B**	**6A**	**6B**
Multiple Choice						
p-value range	.46 to .81	.52 to .74	.27 to .77	.39 to .81	.54 to .92	.39 to .87
pt. biserial r range	.39 to .54	.31 to .52	.24 to .47	.23 to .49	.24 to .47	.29 to .49
% range of omits	.23 to .67	.40 to .69	.39 to .73	.24 to .72	.31 to .62	.37 to .60
Open Ended						
Means	1.69, 2.40	2.08, 2.16	1.58, 2.14	1.55, 2.07	1.71, 1.97	1.86, 2.04
r with total RS	.67, .71	.67, .72	.66, .72	.64, .66	.61, .76	.67, .71
% range of omits	.62 to 1.01	.58 to 1.14	.62 to 1.22	.61 to .88	.44 to .65	.71 to .71
Mean RS	9.6	9.6	8.5	8.3	9.2	9.3
RS std. dev.	2.9	2.9	2.6	2.7	2.8	2.9
alpha reliability	.65	.66	.57	.59	.59	.61
Mean SS	500.0	501.9	497.7	501.6	500.6	499.9
SS std. dev.	65.7	65.0	64.9	68.0	66.7	67.8

Grade 7 Forms

Tables 4.8 and 4.9 contain summaries of the item statistics for the grade 7 reading and science forms, respectively.

Table 4.8
Grade 7 Reading Summary Statistics by Form

Form	1	2	3	4	5	6
Multiple Choice (24 items per form)						
p-value range	.42 to .90	.52 to .93	.47 to .89	.38 to .86	.49 to .85	.28 to .94
pt. biserial r range	.29 to .49	.65 to .74	.21 to .50	.23 to .49	.29 to .49	.29 to .54
% range of omits	.04 to .30	.08 to .51	.06 to .55	.04 to .61	.04 to .44	.04 to .47
Open Ended (6 four-point items per form)						
Mean range	1.75 to 2.32	1.51 to 2.18	1.91 to 2.04	1.70 to 2.15	1.79 to 2.04	1.45 to 2.23
r with total RS	.65 to .71	.64 to .73	.64 to .73	.63 to .76	.67 to .73	.66 to .71
% range of omits	.10 to .81	.48 to 1.68	.69 to 1.38	.67 to 1.43	.66 to 1.55	.52 to 1.21
Mean RS	28.5	29.9	28.1	27.5	26.7	28.6
RS std. dev.	7.8	8.0	8.6	8.5	7.8	7.6
Alpha reliability	.87	.89	.89	.89	.87	.88
Mean SS	511.2	509.8	511.9	510.4	509.5	511.1
SS std. dev.	33.9	34.3	34.2	34.4	34.4	34.1

Table 4.9
Grade 7 Science Summary Statistics by Form

Form	1	2A	2B	3	4	5	6
Multiple Choice (24 items per form)							
p-value range	.29 to .87	.28 to .80	.28 to .80	.37 to .77	.26 to .90	.25 to .85	.32 to .78
pt. Biserial r range	.16 to .47	.14 to .53	.15 to .51	.18 to .54	.0 to .48	.12 to .44	.19 to .46
% range of omits	.10 to .58	.03 to 1.01	.03 to 1.01	.11 to .77	.05 to .49	.03 to .61	.08 to .71
Open Ended (6 four-point items per form							
Mean range	1.17 to 2.18	1.53 to 2.17	1.55 to 2.17	1.36 to 2.08	1.63 to 2.41	1.18 to 2.25	1.77 to 2.25
r with total RS	.60 to .73	.61 to .69	.60 to .69	.56 to .67	.60 to .72	.56 to .68	.53 to .70
% range of omits	.94 to 2.92	.48 to 2.05	.48 to 2.05	1.03 to 2.87	.68 to 1.91	.57 to 2.54	.57 to 2.49
mean RS	23.6	23.9	23.2	24.7	27.0	23.7	25.1
RS std. dev.	8.0	8.0	7.9	7.9	8.0	7.5	7.9
alpha reliability	.85	.84	.84	.83	.84	.82	.84
mean SS	497.6	498.0	498.2	498.4	498.9	497.3	498.0
SS std. dev.	30.2	30.8	30.5	30.8	29.8	30.9	30.1

Grade 8 Forms

Tables 4.10 through 4.13 contain summaries of the item statistics for the grade 8 arts and humanities, mathematics, practical living/vocational studies, and social studies forms, respectively.

Table 4.10
Grade 8 Arts and Humanities Summary Statistics by Form

Form	1A	1B	2A	2B	3A	3B
Multiple Choice (8 items per form)						
p-value range	.45 to .79	.45 to .87	.37 to .82	.34 to .63	.44 to .76	.42 to .80
pt. Biserial r range	.32 to .54	.32 to .45	.31 to .50	.34 to .56	.37 to .52	.29 to .50
% range of omits	1.06 to 1.63	.83 to 1.15	.82 to 1.02	.98 to 1.26	.75 to 1.07	.77 to 1.12
Open Ended (2 four-point items per form)						
Means	1.93, 2.02	1.94, 2.19	1.78, 2.19	1.80, 2.09	2.03, 2.07	1.96, 2.10
r with total RS	.76, .77	.77, .78	.77, .80	.77, .78	.76, .78	.78, .78
% range of omits	1.80 to 3.09	2.83 to 3.48	2.80 to 3.47	1.66 to 2.89	2.29 to 2.82	2.20 to 2.35
Mean RS	9.2	9.5	9.0	7.7	9.1	9.1
RS std. dev.	3.2	3.0	3.2	3.1	3.3	3.2
alpha reliability	.72	.66	.68	.71	.68	.69
Mean SS	500.7	500.9	500.3	498.8	499.8	501.3
SS std. dev.	60.5	62.3	62.0	62.1	63.7	61.0
Form	4A	4B	5A	5B	6A	6B
Multiple Choice						
p-value range	.46 to .75	.39 to .77	.40 to .88	.43 to .82	.34 to .84	.40 to .83
pt. Biserial r range	.34 to .52	.38 to .47	.19 to .50	.36 to .54	.33 to .47	.32 to .49
% range of omits	.85 to 1.05	1.05 to 1.23	.82 to 1.02	.70 to .98	.88 to 1.18	.80 to 1.08
Open Ended						
Means	1.98, 2.14	1.93, 2.18	1.87, 2.06	2.02, 2.31	1.43, 2.55	2.01, 2.15
r with total RS	.75, .80	.75, .75	.79, .81	.76, .79	.66, .78	.76, .78
% range of omits	1.90 to 2.45	2.30 to 2.45	2.75 to 4.17	1.93 to 2.28	1.53 to 4.67	2.00 to 2.43
Mean RS	8.8	8.9	8.9	9.1	8.0	8.4
RS std. dev.	3.3	3.1	3.1	3.2	3.1	3.1
alpha reliability	.71	.67	.64	.71	.61	.67
Mean SS	500.0	499.6	500.1	500.7	497.9	499.8
SS std. dev.	62.0	62.1	62.3	60.4	65.3	61.7

Table 4.11
Grade 8 Practical Living/Voc. Studies Summary Statistics by Form

Form	1A	1B	2A	2B	3A	3B
Multiple Choice (8 items per form)						
p-value range	.60 to .79	.50 to .81	.60 to .81	.50 to .85	.58 to .83	.49 to .77
pt. biserial r range	.47 to .53	.41 to .53	.37 to .57	.35 to .58	.45 to .58	.47 to .55
% range of omits	1.20 to 1.65	. 98 to 1.45	1.12 to 1.44	.96 to 1.64	.95 to 1.35	.80 to 1.15
Open Ended (2 four-point items per form)						
Means	1.81, 2.14	1.93, 2.09	1.37, 1.85	1.60, 1.71	2.02, 2.40	20.8, 2.33
r with total RS	.68, .72	.67, .73	.71, .75	.77, .77	.76, .81	.70, .76
% range of omits	1.97 to 2.52	1.75 to 1.85	2.38 to 3.23	2.47 to 2.77	2.59 to 2.86	1.32 to 2.55
Mean RS	9.5	9.4	9.0	8.8	10.1	9.7
RS std. dev.	3.1	2.9	3.1	3.4	3.5	3.4
alpha reliability	.72	.70	.73	.73	.76	.73
Mean SS	501.7	501.8	500.1	500.0	503.4	501.7
SS std. dev.	62.7	61.4	60.1	62.6	64.4	63.9
Form	**4A**	**4B**	**5A**	**5B**	**6A**	**6B**
Multiple Choice						
p-value range	.61 to .79	.43 to .82	.43 to .85	.55 to .84	.51 to .81	.44 to .78
pt. biserial r range	.37 to .57	.33 to .53	.27 to .55	.39 to .59	.40 to .58	.31 to .54
% range of omits	.90 to 1.23	1.12 to 1.45	.95 to 1.32	.83 to 1.30	1.03 to 1.43	.85 to 1.51
Open Ended						
Means	1.75, 1.91	1.74, 1.93	1.58, 1.73	1.54, 2.25	1.92, 20.6	1.95, 1.98
r with total RS	.72, .74	.74, .76	.71, .73	.73, .75	.68, .72	.73, .75
% range of omits	1.98 to 3.43	1.95 to 2.73	2.10 to 3.05	2.03 to 3.55	1.91 to 2.01	1.56 to 2.16
Mean RS	9.2	9.0	8.4	9.2	9.4	8.9
RS std. dev.	3.1	3.0	2.9	3.2	3.1	3.1
alpha reliability	.73	.69	.67	.72	.72	.68
Mean SS	500.7	499.5	499.6	501.1	501.8	500.5
SS std. dev.	61.1	60.9	60.5	62.6	62.3	62.3

Table 4.12
Grade 8 Mathematics Summary Statistics by Form

Form	1	2	3	4	5	6
Multiple Choice (24 items per form)						
p-value range	.15 to .87	.26 to .82	.48 to .75	.28 to .71	.14 to .79	.21 to .82
pt. biserial r range	.24 to .55	.23 to .57	.33 to .55	.22 to .63	.23 to .56	.11 to .56
% range of omits	.06 to .39	.11 to .51	.10 to .42	.06 to .28	.04 to .25	.08 to .29
Open Ended (6 four-point items per form)						
Mean range	.69 to 1.35	1.04 to 2.38	1.46 to 1.89	1.10 to 1.60	.81 to 2.01	1.25 to 1.98
r with total RS	.62 to .73	.52 to .76	.63 to .75	.67 to .79	.67 to .72	.52 to .74
% range of omits	.66 to 1.76	.24 to 4.28	.82 to 2.27	.79 to 2.27	.56 to 1.87	.69 to 1.57
Mean RS	19.6	22.0	25.0	20.0	21.9	22.1
RS std. dev.	8.7	9.1	9.8	9.8	10.0	8.5
Alpha reliability	.87	.87	.89	.89	.88	.85
Mean SS	525.7	524.4	526.7	523.6	524.9	524.9
SS std. dev.	39.2	39.5	39.0	41.4	40.0	42.1

Table 4.13
Grade 8 Social Studies Summary Statistics by Form

Form	1	2	3	4	5	6
Multiple Choice (24 items per form)						
p-value range	.35 to .80	.31 to .88	.45 to .88	.41 to .86	.27 to .91	.29 to .88
pt. biserial r range	.12 to .53	.08 to .53	.27 to .52	.11 to .47	.18 to .52	.19 to .53
% range of omits	.10 to .49	.08 to .44	.09 to .38	.06 to .38	.11 to .33	.08 to .39
Open Ended (6 four-point items per form)						
Mean range	1.03 to 1.96	1.36 to 2.00	1.33 to 2.02	1.09 to 1.96	1.53 to 2.06	1.07 to 1.96
r with total RS	.65 to .74	.69 to .75	.61 to .73	.61 to .75	.62 to .75	.61 to .73
% range of omits	.61 to 2.92	.51 to 2.21	.46 to 2.48	.66 to 1.78	.89 to 2.14	.41 to 2.07
Mean RS	23.6	24.7	25.3	24.2	26.0	23.6
RS std. dev.	8.4	8.9	8.5	8.0	8.1	8.1
Alpha reliability	.88	.88	.89	.87	.87	.87
Mean SS	503.9	503.1	506.2	503.7	505.6	504.0
SS std. dev.	43.0	43.4	42.8	43.0	42.3	42.6

Grade 10 Forms

Tables 4.14 and 4.15 contain summaries of the item statistics for the grade 10 reading and practical living/vocational studies forms, respectively.

Table 4.14
Grade 10 Reading Summary Statistics by Form

Form	1	2	3	4	5	6
Multiple Choice (24 items per form)						
p-value range	.40 to .90	.30 to .80	.42 to .85	.15 to .78	.38 to .86	.33 to .83
pt. Biserial r range	.08 to .53	.15 to .52	.26 to .52	.13 to .49	.30 to .53	.22 to .50
% range of omits	.09 to .50	.12 to .50	.09 to .57	.16 to .62	.05 to .55	.15 to .55
Open Ended (6 four-point items per form)						
Mean range	1.85 to 2.17	1.60 to 2.22	1.72 to 2.32	1.74 to 2.24	1.80 to 2.07	1.71 to 2.24
r with total RS	.75 to .77	.68 to .75	.71 to .76	.70 to .76	.72 to .76	.68 to .76
% range of omits	1.07 to 2.48	1.44 to 2.71	1.44 to 3.97	.96 to 5.29	1.61 to 3.08	1.14 to 5.04
Mean RS	27.2	24.8	27.6	26.8	27.3	26.2
RS std. dev.	8.8	8.0	8.7	8.6	9.3	8.7
Alpha reliability	.88	.85	.88	.88	.90	.88
Mean SS	498.6	496.1	499.4	497.9	499.7	498.4
SS std. dev.	54.1	55.5	55.5	54.9	55.6	55.3

Table 4.15
Grade 10 Practical Living/Voc. Studies Summary Statistics by Form

Form	1A	1B	2A	2B	3A	3B
Multiple Choice (8 items per form)						
p-value range	.55 to .80	.42 to .50	.39 to .76	.43 to .83	.51 to .73	.52 to .70
pt. Biserial r range	.39 to .53	.38 to .52	.39 to .54	.32 to .47	.40 to .45	.32 to .44
% range of omits	1.82 to 2.11	1.18 to 1.53	1.30 to 1.84	.94 to 1.21	1.21 to 1.42	1.18 to 1.36
Open Ended (2 four-point items per form)						
Means	1.86, 2.01	1.03, 1.12	1.66, 1.75	1.86, 1.91	1.88, 2.23	1.96, 2.24
r with total RS	.74, .76	.76, .76	.58, .69	.73, .74	.67, .73	.74, .76
% range of omits	2.69 to 4.73	1.94 to 3.07	2.32 to 3.06	2.56 to 3.43	2.25 to 3.33	1.87 to 3.61
Mean RS	9.1	9.7	8.1	8.6	8.9	9.0
RS std. dev.	3.4	3.3	3.1	3.0	2.9	3.1
alpha reliability	.71	.70	.67	.64	.65	.64
Mean SS	501.1	500.9	499.1	499.2	498.7	500.9
SS std. dev.	63.9	63.5	65.8	63.2	62.9	63.3
Form	4A	4B	5A	5B	6A	6B
Multiple Choice						
p-value range	.38 to .85	.46 to .79	.49 to .85	.43 to .82	.52 to .77	.53 to .82
pt. Biserial r range	.28 to .47	.39 to .47	.34 to .51	.37 to .52	.33 to .45	.31 to .50
% range of omits	1.30 to 1.76	1.46 to 1.60	1.10 to 1.58	1.28 to 1.68	.99 to 1.29	1.10 to 1.61
Open Ended						
Means	1.38, 1.93	1.89, 2.10	2.15, 2.18	1.62, 1.74	2.07, 2.09	1.83, 2.24
r with total RS	.70, .74	.72, .73	.69, .70	.71, .75	.72, .72	.67, .74
% range of omits	2.21 to 6.66	2.02 to 2.45	2.01 to 3.13	3.49 to 4.95	1.90 to 2.36	2.36 to 2.95
Mean RS	8.5	9.1	9.8	8.3	9.3	9.3
RS std. dev.	2.9	2.9	2.9	3.1	3.0	3.0
alpha reliability	.62	.65	.65	.67	.64	.65
Mean SS	500.3	499.9	502.5	500.0	501.0	501.6
SS std. dev.	63.5	61.5	63.6	63.5	64.2	65.5

Grade 11 Forms

Tables 4.16 through 4.19 contain summaries of the item statistics for the grade 11 arts and humanities, mathematics, science and social studies forms, respectively.

Table 4.16
Grade 11 Arts and Humanities Summary Statistics by Form

Form	1A	1B	2A	2B	3A	3B
Multiple Choice (8 items per form)						
p-value range	.30 to .77	.36 to .73	.43 to .80	.22 to .79	.38 to .78	.46 to .77
pt. Biserial r range	.30 to .52	.14 to .51	.34 to .49	.25 to .53	.34 to .50	.37 to .48
% range of omits	1.91 to 2.18	1.34 to 1.58	1.58 to 1.87	1.45 to 1.76	1.46 to 1.82	1.74 to 1.98
Open Ended (2 four-point items per form)						
Means	1.73, 1.95	1.77, 1.77	1.98, 2.20	2.08, 2.09	1.88, 1.90	1.71, 1.99
r with total RS	.78, .78	.78, .79	.78, .80	.78, .81	.79, .80	.77, .80
% range of omits	4.30 to 4.54	5.38 to 5.92	2.80 to 4.25	3.90 to 5.08	3.79 to 5.54	4.71 to 6.13
Mean RS	8.4	7.8	9.0	8.4	8.3	8.4
RS std. dev.	3.2	3.4	3.2	3.3	3.3	3.3
alpha reliability	.70	.70	.70	.68	.71	.70
Mean SS	499.2	498.4	499.9	499.8	496.9	498.3
SS std. dev.	61.2	64.0	62.3	63.4	61.9	62.6
Form	4A	4B	5A	5B	6A	6B
Multiple Choice						
p-value range	.51 to .79	.35 to .72	.27 to .76	.30 to .68	.34 to .69	.29 to .89
pt. Biserial r range	.39 to .50	.32 to .50	.21 to .44	.25 to .54	.29 to .52	.26 to .48
% range of omits	1.42 to 1.87	1.05 to 1.20	1.18 to 1.45	1.10 to 1.34	1.53 to 2.11	1.23 to 1.80
Open Ended						
Means	1.80, 1.93	1.92, 2.02	1.83, 2.21	1.77, 1.96	2.15, 2.22	1.70, 1.95
r with total RS	.78, .78	.78, .80	.79, .80	.75, .78	.77, .78	.80, .81
% range of omits	4.65 to 4.77	3.40 to 5.65	2.93 to 4.68	2.78 to 4.65	3.31 to 5.27	6.09 to 7.50
Mean RS	8.6	8.5	8.1	7.2	8.5	8.1
RS std. dev.	3.3	3.3	3.1	3.1	3.3	3.3
alpha reliability	.71	.68	.65	.66	.68	.68
Mean SS	498.0	499.5	499.1	498.0	500.7	498.8
SS std. dev.	61.5	62.3	62.6	65.3	71.9	63.2

Table 4.17
Grade 11 Mathematics Summary Statistics by Form

Form	1	2	3	4	5	6
Multiple Choice (24 items per form)						
p-value range	.15 to .95	.10 to .84	.45 to .74	.16 to .56	.17 to .69	.16 to .88
pt. Biserial r range	.09 to .48	.12 to .48	.27 to .57	.08 to .51	.07 to .54	.20 to .48
% range of omits	.06 to .36	.06 to .32	.12 to .51	.08 to .36	.11 to .38	.09 to .56
Open Ended (6 four-point items per form)						
Mean range	.54, 1.70	.42 to 1.43	1.30 to 2.25	.78 to 1.24	.94 to 1.77	.69 to 1.73
r with total RS	.67 to .78	.62 to .80	.63 to .78	.64 to .74	.64 to .76	.67 to .78
% range of omits	.98 to 5.51	2.58 to 4.93	1.68 to 4.68	1.57 to 7.01	1.91 to 5.18	1.97 to 5.60
Mean RS	15.1	13.7	24.5	15.3	16.8	18.4
RS std. dev.	8.7	7.0	10.2	1.3	8.1	8.9
Alpha reliability	.85	.84	.88	.86	.84	.87
Mean SS	523.8	523.8	527.5	522.9	523.0	525.2
SS std. dev.	51.8	49.9	49.0	50.2	50.1	49.2

Table 4.18
Grade 11 Science Summary Statistics by Form

Form	1	2	3	4	5	6
Multiple Choice (24 items per form)						
p-value range	.32 to .90	.17 to .94	.40 to .83	.40 to .93	.23 to .73	.20 to .91
pt. biserial r range	.20 to .48	.11 to .45	.13 to .53	.24 to .47	.15 to .46	.14 to .41
% range of omits	.06 to .42	.06 to .27	.09 to .23	.00 to .24	.05 to .23	.08 to .33
Open Ended (6 four-point items per form)						
mean range	.46 to 1.77	.82 to 2.12	1.63 to 1.98	1.31 to 2.26	.89 to 1.96	.95 to 1.85
r with total RS	.47 to .69	.61 to .68	.57 to .70	.61 to .71	.55 to .64	.61 to .67
% range of omits	1.50 to 9.97	8.76 to 15.99	1.16 to 5.04	2.13 to 7.20	1.73 to 5.90	1.55 to 4.04
mean RS	21.8	18.1	24.7	24.1	19.2	19.3
RS std. dev.	7.3	7.5	7.7	8.7	7.3	7.0
alpha reliability	.82	.80	.83	.85	.81	.80
mean SS	538.1	535.9	537.5	537.3	536.9	537.8
SS std. dev.	36.0	63.3	36.0	36.5	38.2	37.2

Table 4.19
Grade 11 Social Studies Summary Statistics by Form

Form	1	2	3	4	5	6
Multiple Choice (24 items per form)						
p-value range	.25 to .84	.30 to .79	.41 to .82	.26 to .88	.31 to .90	.20 to .76
pt. biserial r range	.18 to .46	.19 to .48	.30 to .57	.07 to .43	.09 to .54	.20 to .49
range of omits	.12 to .30	.08 to .47	.05 to .29	.04 to .30	.03 to .27	.06 to .27
Open Ended (6 four-point items per form)						
mean range	1.68 to 2.10	1.48 to 2.23	1.56 to 2.09	1.28 to 2.11	1.13 to 2.01	1.41 to 2.03
r with total RS	.67 to .76	.64 to .75	.68 to .74	.64 to .73	.65 to .77	.66 to .75
range of omits	1.73 to 4.37	2.23 to 6.25	1.81 to 3.98	1.47 to 5.11	2.10 to 6.23	2.06 to 4.57
Mean RS	24.2	24.8	26.3	23.3	23.3	20.8
RS std. dev.	8.6	8.9	8.8	8.0	8.7	7.8
Alpha reliability	.86	.88	.88	.84	.86	.85
Mean SS	540.0	540.8	541.3	542.1	540.7	539.1
SS std. dev.	49.9	50.3	49.6	50.8	51.5	50.8

Summary

By examining the means and standard deviations, the forms of the Kentucky Core Content Tests can be considered comparable to each other. In addition, the alpha internal consistency coefficients for reading, mathematics, science, and social studies are acceptable for student scores. The alpha coefficients for Arts & Humanities and Practical Living/Vocational Studies are not as high, because they are much shorter tests that cover a broad domain. Past practice has been that due to the decreased score reliability, these scores are used in school accountability and have not been reported at the student level. After consideration of the kinds of uses to be made of these data, the National Technical Advisory Panel has considered that it is all right to produce these scores at the individual level.

The reliability of the Kentucky Core Content Tests in reading, mathematics, science, and social studies is comparable to what might be expected in commercially available standardized assessments. The reliability of the Practical Living/Vocational Studies and Arts & Humanities tests are somewhat smaller because they are relatively short tests and perhaps because they tend (by design) to measure more diverse content as opposed to the other content assessments.

Very few students omitted items from the tests. The percentages of students omitting both multiple-choice and open-ended items provide evidence that the test is a power test of the students' skills not of their ability to pace themselves through a timed assessment.